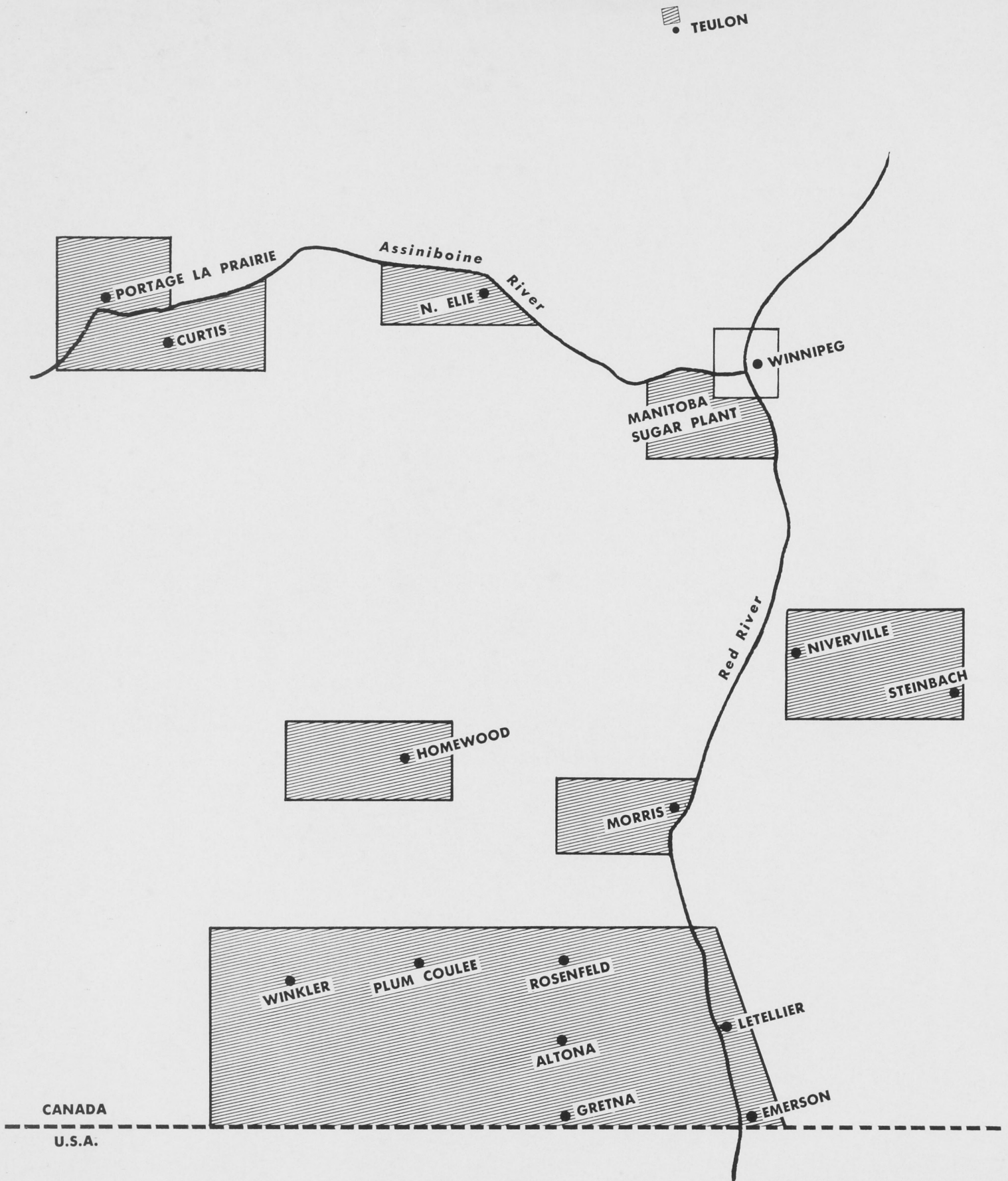


The Manitoba Sugar Industry

FORT GARRY



PRODUCT OF MANITOBA AGRICULTURE



TWO-THIRDS OF MANITOBA SUGAR BEETS ARE GROWN IN THE
LETELLIER-WINKLER-GRETNA AREA.

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The Manitoba Sugar Industry

Published by

**THE MANITOBA SUGAR COMPANY LIMITED
FORT GARRY, MANITOBA**

and

THE MANITOBA BEET GROWERS ASSOCIATION

●
Written by
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(Retired U. of M.)

F O R E W O R D



This booklet on the Manitoba sugar industry has been prepared and printed primarily for the use of teachers of Social Studies in our schools. It is designed to provide information for the teacher rather than to provide a text book for the pupil. Agriculture is a very important element in our Manitoba economy, but it is surprisingly difficult for many of our teachers to obtain dependable, up-to-date information on this subject. It is hoped that this little booklet will be a start toward filling a need in our schools.

As many of our teachers know, there is also available for classroom use a 16 mm., 25-minute sound and colour film showing in good clear pictures the various stages of sugar beet cultivation and the processing of sugar. This film, called "This is Manitoba Sugar" may be obtained from the visual Education Branch of the Manitoba Department of Education, 116 Edmonton Street, Winnipeg, Manitoba.



In sugar beet growing a great deal of handwork is required for thinning and weeding within the row.

Sugar is a Product of Sunshine and Green Leaves

SCIENTISTS TELL US that there are more than a hundred different kinds of sugar. Every plant with green leaves produces sugar of some kind, always composed of carbon, hydrogen and water and known as a carbohydrate. The atoms of hydrogen and oxygen are nearly always combined in the ratio of two atoms of hydrogen to one of oxygen, H_2O , the ratio in which they combine to form water. The granulated white sugar we use at the table is known to the chemist as sucrose. It may be obtained from a number of well known plants, but is obtained commercially in very great quantity from two plants only, sugar beets and sugar cane. When fully and properly refined sugar from cane and sugar from beets are identical, with the same chemical formula $C_{12}H_{22}O_{11}$. Both are practically 100% pure sucrose.

The green pigment, chlorophyll, which gives color to grass and leaves, is the key to nature's production of sugar. Chlorophyll is the essential agent which combines with air, water and sunlight to produce our sugar. The roots of the plant take up large quantities of water from the soil. This moisture moves up through the plant to be finally given off into the air through pores or stomata in the leaves. Through these same pores carbon dioxide from the air enters the leaf. When sun-

light shines on the leaves, the miracle occurs — carbon and water are combined to form sugar. This process of nature's is known to the scientist as photosynthesis.

SOME EARLY HISTORY

Cane was known as a source for sugar as far back as the beginning of the Christian era. There are references to cane sugar in the Bible, one of which may be found in Jeremiah VI - 20. Crusaders nearly a thousand years ago brought back to England from Arabia both the name sugar and the sugar itself which was then very imperfectly refined and produced in very small quantities. Originally it was regarded as a valuable medicine.

Refining of sugar in the modern sense did not begin until the fourteenth century, but by the year 1500 it had become an important article of international trade. Prices were very high, which made sugar available only to the wealthy. Queen Elizabeth I is credited with introducing the custom of having a bowl of sugar on the table.

High prices charged for sugar by the merchants of Venice who had a monopoly of the trade at this time led to competition from the Portuguese who introduced sugar cane to the island of Madeira.

Columbus took with him sugar cane plantings on his voyage of discovery of the new world and expressed satisfaction at the way the sugar canes took root. Supplies from the West Indies and South America increased and prices declined until sugar became a part of everyone's diet. This rapid development of the cane sugar industry was closely associated with slavery, which it helped to establish and maintain.

SUGAR FROM SUGAR BEETS

In 1747, Andreas Marggraf, a German chemist, proved the existence in beet roots and carrots, of sugar identical to the well known sugar from cane. However, for more than fifty years no further advance was made in this field. The real stimulus to beet sugar production was given by Napoleon. In 1811 the French found themselves cut off by the British fleet from the sugar that usually flowed to them from the West Indies, and price of sugar had mounted to more than a dollar per pound. Moreover, Napoleon needed sugar for his armies. He is the author of the statement, "an army marches on its stomach," and sugar has always been recognized as the readily available energy food. When Napoleon learned that sugar could be obtained from beets, he took immediate action. In 1812 France had 79,000 acres growing sugar beets and some thirty small factories processing beet sugar.

Waterloo put a temporary end to beet sugar production. Sugar flowed in again from the West Indies. However, it had been learned that sugar beets have an important place in agriculture and by the middle 1830's the beet sugar industry was re-established in France on a sound and permanent basis.

Beet seeds are planted by six-rowed precision drills, accurately spacing seeds about 1½ inches apart in rows 20-24 inches apart.



In 1836 beet sugar production was first attempted in the United States, having been brought there from France. However, for more than forty years there was an unbroken succession of failures in the technique of beet sugar processing. It was not until 1879 that the first successful plant was established at Alvarado in California, but from that date progress was rapid. The century closed with thirty sugar processing plants operating in Western United States. Now there are 63 factories in U.S. operating in 22 states from Ohio to the west coast. About 40,000 farmers cultivate around a million acres of sugar beets from which is produced annually more than two million tons of beet sugar. Cane sugar is produced in two mainland states, Louisiana and Florida. Something over 600,000 tons of cane sugar is produced annually.

BEET SUGAR PRODUCTION COMES TO CANADA

Interest in sugar beet growing naturally spread to Canada. In 1902 the first Canadian processing plant was built in Wallaceburg, Ontario. In 1903 a plant was built in Alberta. This plant was closed and dismantled in 1915 but was rebuilt under new ownership in 1925. The Manitoba Sugar Company plant in Fort Garry was opened in 1940 after more than twenty years of investigation and experimentation. There are now six beet sugar plants in Canada producing less than 20 per cent of the sugar consumed in Canada. Alberta has three plants at Raymond, Picture Butte and Taber, all in the southern part of the province where irrigation is available. Manitoba has one plant at Fort Garry, Ontario one at Chatham and Quebec one near Montreal. About 80 per cent of the sugar used in the three prairie provinces is from sugar beets grown in Alberta and Manitoba.

Fertilizer distributed along the beet row by the seeder helps to produce a better crop of beets and helps maintain fertility of the soil.





The cultivator removes weeds between the rows. This cultivation is repeated several times during the growing season.



The mechanical thinner reduces the stand of beets to one for 12 to 15 inches of row, giving the beets room to grow and expand.

Sugar Beet Growing in Manitoba

WHEN THE MANITOBA SUGAR COMPANY first started operations in 1940, sugar beets were grown on all soil types to be found in the Red River Valley. However, there has been a steady shift from heavy clay soil to lighter loam and sandy loam soil. Beets will grow satisfactorily in heavy clay soils, but the difficulty of operating machinery after rains resulted in the shift to lighter land. About two-thirds of the Manitoba sugar beets are now grown in the southern part of the province in the Letellier-Emerson-Altona-Winkler area. The Portage la Prairie area has had on the average the heaviest production per acre. Beets are grown as far north as Teulon. All sugar beets must be grown within about 75 miles from the processing plant on account of the freight on the beets.

CONTRACT FARMING

Each beet grower has a contract with the company for cultivation of an agreed number of acres of sugar beets. This contract assures the grower a supply of thoroughly tested seed and fertilizer, with guidance and advice from experienced agricultural and field staff supplied by the company. It also assures him a ready market for his beets with prompt cash payment. The contract assures the company a supply of beets for the factory. Payment for the beets and ownership of sugar produced is on a share basis. Out of every 100 pounds of sugar grown on his farm, the grower's share is normally about 61 pounds. When prices rise as in 1963 the share to the growers increases to 63% of total returns from sale of sugar. Three-quarters of the estimated value is paid when the beets are

delivered, the remainder in three installments. Final payment is made when the year's production of sugar is sold.

Acreage contracts range from 5 acres to 250 acres with some fifteen to twenty growers contracting for 100 acres or more and each producing more than 1,000 tons of beets. Due to increase in mechanization and the heavy cost of machinery the trend has been to an increase in the size of individual contracts. In 1940, 1,169 farmers contracted to cultivate 19,968 acres, an average of a little over 17 acres per farmer. In 1963, 760 growers contracted to cultivate 31,000 acres, an average of 40 acres per farmer.

SEEDING, THINNING AND CULTIVATION

Almost invariably beets are grown on summer-fallow. Very careful cultivation is practised in order to conserve moisture and prevent soil drifting. Many beet growing areas have irrigation but the normal rainfall on our fertile Red River Valley soil is sufficient for beet growing if careful cultivation is maintained. Seeding starts not earlier than May 1st in order to avoid damage from frost. Seeds are planted not more than 1" deep, 1½" apart and in rows 20" to 24" apart. Seeds specially developed for our northern climate and tested fertilizer are supplied by the company to be paid for by the growers from the oncoming crop.

About a month after the seeds are planted the work of thinning begins. Seeds are planted one inch apart but the beet must have about 12" to 15" of space in the row to obtain full growth. In this thinning operation weeds must be removed as well as

excess beets. Efficient machines for thinning are available but have been slow in coming into general operation. Reluctance of the growers to use thinning machines will probably be overcome in time. The extra labor required for thinning is usually much more than is available locally. Until recently the extra labor was obtained chiefly from new immigrants. Since 1959 Indian workers have been employed in greatly increased numbers. Many of the Indians employed had never before seen a sugar beet nor handled a hoe but very good work is being done to the mutual advantage of growers and Indians. In 1960, 1,200 Indians were employed and paid \$112,000 for thinning beets.

Cultivation between the rows normally starts as soon as the young beets appear above the ground. Here again a double objective is sought, removal of weeds and prevention of soil drifting. Beets are cultivated once, sometimes twice, before thinning starts. In this machine cultivation between the rows, only a very narrow band of 2" or less is left uncultivated down the row of beets, thereby reducing the amount of hand labor necessary for removing weeds in the row. Beets are cultivated two or three times after thinning, continuing until the leaves from one row meet the leaves from the next row.

HARVESTING

Harvest starts during the last half of September, reaches its peak early in October and is normally complete by October 20th. Percentage of sugar obtainable from the beets depends on the weather and particularly on harvest weather. Warm, sunny days and cool nights are favorable to accumulation of sugar in the beets. Rain encourages continued growth of the beets but slows up sugar formation. A severe frost of 10 degrees or more will stop growth and of course any further storage of sugar.

Originally beets were harvested with a great deal of hand labor. Now 100% of the crop is harvested by machine. Two men with two machines—one cutting off tops, the other lifting three rows of beets—will harvest as many acres in one day as were harvested by fifty men twenty years ago. At peak harvest season as many as fifteen to eighteen thousand tons of beets will arrive in a single day at the factory and the fourteen receiving stations scattered throughout the beet growing area. Within a radius of 35 miles beets are normally brought to the factory by truck; beyond this distance they come by train. At the factory and at two receiving stations beets are stored in massive piles which are ventilated to keep the beets cool and fresh, thereby conserving sugar.

RESEARCH

Agricultural research has been carried on continuously by The Manitoba Sugar Company since the opening of the plant in 1940. Chief items of research are the testing of beet varieties to determine suitability to our soil and climate, the testing of fertilizers including kinds, rate of application and placement, and all cultural practices. Beets harvested in the experimental test plots are analyzed in the plant research laboratories to determine quality. The company also collaborates with The University of Manitoba and chemical companies in testing new insecticides and herbicides specially related to sugar beet growing. In addition to this highly necessary local work, all beet companies of Canada and the U.S.A. have formed a Beet Sugar Development Foundation. This organization carries out a research program at Universities and Government Agricultural Research Stations with an annual outlay of \$150,000. Results

Beets have large tops which by mid-summer fill the space between the rows, stopping further cultivation.





The rotobeaer and scalper removes the tops from the beets and cuts off the crowns, leaving the beets ready for lifting.



The most modern type of harvester lifts three rows of beets at a time after the beets have been topped by the rotobeaer.

of this research are available to all member companies.

An example of the nature of sugar beet research may be seen in the continuous effort to produce better seed. In 1940, when the whole multigerm beet seed was planted, five or six plants came up in a cluster. The work of thinning this cluster of beets to one beet by using a short handled hoe was very laborious. A machine was developed to break up the seed pod into sections, each having one to three seeds. Fewer seeds germinated from each section and thinning was made easier. Plant science has now produced a monogerm seed from which one plant germinates, reducing hand labor still further. The company research department and the farmers are co-operating in testing the new monogerm seed to determine the varieties best suited to our soil and climate.

4-H SUGAR BEET CLUBS

The first 4-H Sugar Beet Clubs were formed in 1956 with 21 members in two clubs. In 1961 there were 13 clubs and 158 members. Each club has a contract with The Manitoba Sugar Company and each member has a contract with the club to grow one acre of sugar beets. Prizes are given for highest general proficiency, for the best seed plot and for the best set of records. The activities and special training of 4-H Sugar Beet Club members give promise not only for better sugar beet growing but for good citizenship.

PROBLEMS AND DIFFICULTIES

There are many problems and difficulties in connection with the growing of sugar beets. Weather is a variable factor quite beyond the farmers' control. In 1959, early winter with heavy snowfall buried about 70,000 tons of beets which could not

be harvested. In 1961 no rain fell until mid-July and beets on 7,000 acres, 25% of the Manitoba crop, failed to germinate. In 1962 so much rain fell in May and June that about 7,000 acres of the acreage contracted for could not be seeded. Each spring from 2,000 to 3,000 acres have to be replanted due to various causes such as insect damage, late spring frost, soil drifting, or crusting after heavy rainfall. Normally about 4,000 acres must be sprayed for control of cutworms, and for several years past some 10,000 acres have had to be sprayed for beet webworm. However, sugar beets will stand up to adverse conditions better than most farm crops. Fortunately, extremes of drought or flood are rare in Manitoba and our sugar beets are free from disease which often causes heavy loss farther south.

The chief difficulty in beet sugar production in Canada for both growers and processing companies has been the continuing low price of sugar. Price of sugar in Canada has advanced at a slower rate than the price of almost every other commodity we use. According to the Dominion Bureau of Statistics the price of commodities and services used by farmers in Western Canada advanced by 140% in the years 1941 to 1961. During these same years the retail price of sugar in Winnipeg advanced by a little less than 18%. The selling price of sugar in Canada is lower than in almost every other sugar importing country in the world. Retail price of sugar in the United States is normally two to three cents per pound higher than in Canada.

There have been sharp rises in price of sugar due to world shortage or threatened shortage as happened in 1950 during the Korean War and again in 1956 due to the Suez disturbance. In both cases increased world production stimulated by increased prices resulted promptly in a surplus. If history repeats itself the increased price of 1963

due to world shortage will be followed by increased world production and a return to the normally low prices. However, the pattern may change to some extent due to increase in world consumption.

YIELDS OF SUGAR BEETS IN CANADA

Yields of sugar beets per acre in Manitoba range from a low of 5 or 6 tons per acre to a high of 15 to 17 tons. From 25% to 40% of the acreage planted produce upwards of 12 tons per acre. Total costs of production per acre vary from \$80 to \$100 per acre with the higher cost per acre usually resulting in a lower cost per ton on account of better yields. For the years 1952 to 1961 the average yield of sugar beets per acre in Manitoba was 9.62 tons. The average yield in Alberta due to availability of irrigation is close to 13 tons per acre. Irrigation, however, adds something to cost per acre. Yield in Ontario, with a longer growing season and more abundant rainfall than in Manitoba, is still higher than in Alberta. Manitoba has a short growing season and only moderate rainfall but has exceptionally fertile soil in the Red River Valley.

BENEFITS

Sugar beet growing has been a valuable addition to Manitoba agriculture. On account of the expense involved in sugar beet cultivation, good cultural practices are essential. Soil fertility is maintained by use of green manures and commercial fertilizers. Thorough cultivation resulting in our nearest approach to weed-free land makes possible the production of registered seed grain. Equipment necessary and experience gained fit in well with production of other row crops, especially corn and sunflowers. The fleshy root of the sugar beet digs

ten to fifteen inches into the soil and sends fibrous rootlets down several feet to feed on soil untouched by most other crops. Because it penetrates and aerates the land the beet has very special value as part of the crop rotation.

Aside from collateral benefits above suggested, sugar beets are in themselves a very valuable crop. Average returns in Manitoba will produce about ten tons of beets per acre, which will produce around 2,600 pounds of sugar. In addition, there are two valuable by-products, dried pulp and molasses. From the sugar beet crop of 1961, dried pulp to the value of \$500,000 was produced, of which about 90% was shipped to livestock feeding centres of Eastern Canada and the U.S.A. Until very recently the same high percentage of molasses was shipped out of the province. Changes in processing improved the quality and produced molasses easier to handle in our cold winter weather. From the 1961 crop the total production of molasses to the value of \$180,000 was sold in Manitoba and Saskatchewan. In Alberta all the abundant beet pulp produced in that province is used by experienced stockmen in special high energy rations for livestock feeding. It will probably not be long before Manitoba dried beet pulp is all used by our own livestock industry.

In the year 1962 Manitoba beet growers contracted to cultivate slightly over 30,000 acres of sugar beets. Under normal growing conditions these acres harvested would make possible the production of nearly 80 million pounds of sugar. Total value of the sugar crop and the by-products would amount to about \$8,000,000. No other one acre in our western agriculture can produce a crop equal in value to one acre of sugar beets.



The sugar beet harvester tops, cleans and loads the beets into a truck for delivery.



Beets grown within about 35 miles from the factory are usually delivered by truck.



Beets grown beyond 35 miles from the factory are usually delivered by train.

Refining Beet Sugar

PROCEDURE FOR EXTRACTION and refining of sugar from beets is basically the same in all beet sugar factories. Processing of beet sugar is seasonal as there is no practical method of storing beets for long periods of time. Where harvest temperature is high as in California, effort is made to process beets within 24 hours of lifting. In Manitoba beets are harvested in a period of about four weeks in the late fall. Beets that cannot be processed immediately are stored in large piles through which cool air is pumped at night to keep the beets cool and fresh. The processing period, or "Campaign" as it is called, lasts from 75 to 100 days with operations continuous for 24 hours per day. The Fort Garry plant was originally designed to process 1,500 to 1,800 tons of beets per day. However, improved equipment and better techniques of processing have increased the capacity to more than 2,700 tons which means the production of approximately 700,000 pounds of sugar per day.

Beets are conveyed from railway cars to the factory by means of water flowing in a concrete flume. Devices for removing beet leaves, floating debris, sand, stones, etc., operate along the flume. From the flume the beets flow into a special pump which moves them to a beet washer where all dirt is removed. They are now ready for processing, which may be divided into four stages: (1) diffusion, (2) purification, (3) evaporation and (4) crystallization.

1. DIFFUSION

Diffusion is the name given to the process of extracting sugar bearing juices from the beets.

The washed beets are first passed through slicing machines which cut them up into what looks like bundles of white shoe strings which are called "cossettes". A bit of history is indicated by this French word "cossettes". The first large crop of sugar beets was harvested and processed in France in 1812 at the time of the Napoleonic wars. These cossettes are carried on a conveyor to the diffuser and are carried through the diffuser by a special "ribbon" or "scroll" type of conveyor. Here they are moved against a flow of hot water which diffuses or "soaks out" the sugar from the sliced beets. Steam jackets enclosing the diffuser maintain accurate control of temperature, making possible efficient extraction of sugar.

Two products emerge from the diffuser. One is beet pulp — cossettes with all or nearly all the sugar removed. The pulp is put through presses to remove part of the water, and this water, containing sugar, is returned to the diffuser. The pressed pulp is conveyed to the pulp drier and the remaining water is driven off as steam. The clouds of steam that may be seen rising from the processing plant when in full operation is from the drying of the beet pulp. Much of the steam produced by evaporation is recovered as distilled water to be used in various stages of processing and as a supply of pure water for the boilers. About 1,200 tons of distilled water are recovered daily. Molasses is usually added to the pulp before it enters the drier. This by-product is known as Dried Molasses Beet Pulp and is a valuable livestock feed.



Sugar beet seed for Western Canada is grown in the Fraser Delta, B.C. The seed is harvested in a manner very similar to the harvesting of grain.



On account of very light rainfall, irrigation is necessary in the Alberta beet growing areas. Here water is taken to the field in ditches and distributed in furrows between the beet rows.

Another way of distributing water from irrigation is by long lines of sprinklers.



2. PURIFICATION

The other and chief product from the diffuser is sugar bearing liquid which is now called raw juice. This juice contains 10% to 15% sugar and both soluble and insoluble non-sugar materials which must be removed. Milk of lime is added and carbon dioxide gas, CO_2 , is bubbled through the limed juice causing the non-sugar material and the lime to join together in an insoluble form. This process of purification is called carbonation. Most of the lime and non-sugar material take the form of sediment and sink to the bottom of the tank and are pumped away. More carbon dioxide gas is passed through the juice. At this stage sulphur dioxide gas is also added which has a bleaching effect and reduces alkalinity. All remaining solids are now removed by filtration. The remaining liquid is now called thin juice, and is ready for extraction of sugar.

3. EVAPORATION

The partially purified juice is now passed to evaporators where half the water is removed. The juice now consists of more than 50% solids in solution and is passed through high pressure filters to remove all insoluble non-sugar materials. The juice is now called evaporator thick juice.

4. CRYSTALLIZATION

This is one of the most interesting parts of the process because it is here the sugar which is in solution in the thick juice is changed into crystals of sugar. The thick juice is boiled in a vacuum pan which has steam tubes in the bottom and is very similar to the evaporator tanks. They are called vacuum pans because the air is drawn out of them when they are operating thus causing a vacuum inside the tank. This allows the juice to boil at about 150 degrees Fahrenheit instead of 212°F. (the temperature at which water boils in a kettle) and prevents the sugar from burning and sticking to the tubes. When the thick juice is boiled it gradually becomes thicker and when it is just the right thickness a cup of very fine sugar is put into the boiling juice. The fine sugar contains millions of tiny sugar crystals that can only be seen under a microscope and because the juice is so concentrated the sugar comes out of solution and attaches on to the surface of the tiny crystals. Thus crystals are formed that are shiny and clear and look like small diamonds. The crystals grow larger in size as the boiling continues and it takes a skilful sugar boiler to make sugar so that all the crystals grow to the same size. Crystallization is also an excellent method of purification because only pure sugar will grow on the crystals. The vacuum pan soon becomes full of a mixture of sugar crystals and a thick brown liquid called molasses that contains non-

sugars. These are the impurities that were not removed from the juice in the carbonation process.

All that now remains is to pass the crystals, heavy with molasses, through centrifugal machines turning at high speed. The molasses is thrown outward and the sparkling white sugar is retained within a fine wire cage. The sugar is now dried, cooled and screened to obtain complete uniformity of grain. The pure white sugar is then conveyed to packaging machines or to bulk storage bins ready to be moved to our stores and their customers and to manufacturers.

EMPLOYMENT OF LABOUR

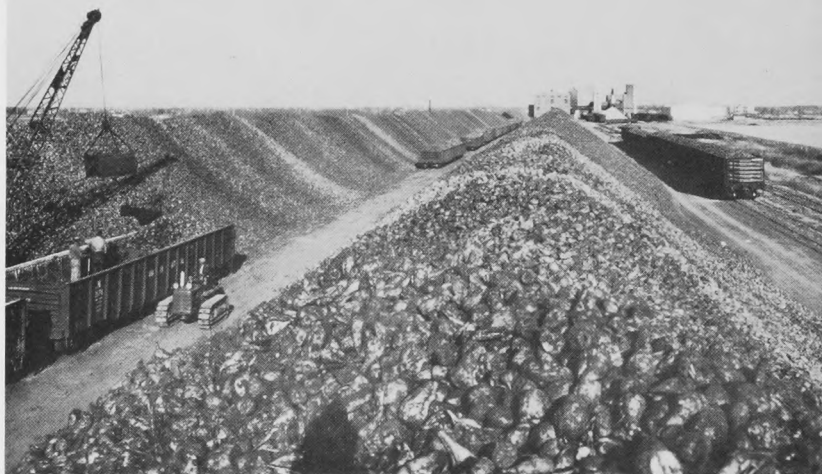
In addition to making possible the production of a new and valuable crop for Manitoba, The Manitoba Sugar Company's plant in Fort Garry provides employment on a fairly large scale, with an annual payroll of over \$750,000. There are 80 full-time employees, about one-quarter of them in office administration and three-quarters in plant operation. The number increases to nearly 500 during the three months processing season called the "campaign." Of nearly 400 seasonal employees around 70% are from farms where the grain harvest has been completed. About two-thirds of the seasonal employees return each year.

To labour employed by the Company may be added the labour employed by the growers. Total wage bill on the farms for a crop of 28,000 acres of sugar beets will come to approximately \$800,000.

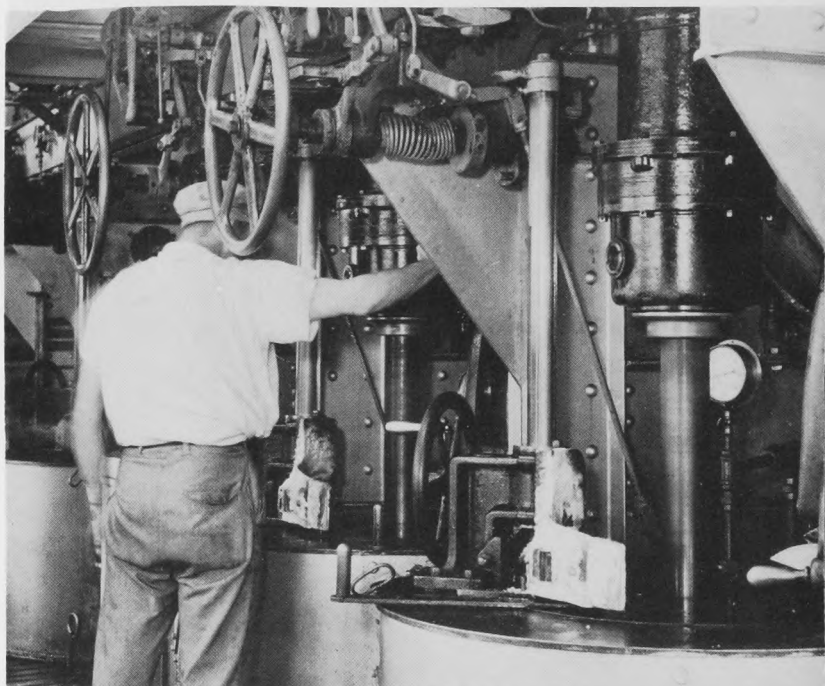
PLANT IMPROVEMENT

More than three million dollars were invested between 1955 and 1963 in modernizing and improving the processing plant and its equipment. Dominant among the changes made was the installation of modern instruments for automatic control of processing operations thereby insuring both increased production and improved quality of product. A complete new sugar drying and screening station was installed to ensure uniformity in the sugar grain, an important factor in precision cooking.

Changes made have resulted in a marked increase in the daily production capacity of the plant. In 1954 an average of 1,940 tons of beets were processed per day. In 1961 this had been increased to 2,740 tons per day. Increased production naturally created a need for increased sugar storage and shipping facilities. In 1962 three concrete silos or storage bins, 50 feet in diameter and 150 feet high, at a cost of \$650,000, were built to store thirty million pounds of sugar. These bins are lined with wood and equipped with conditioned air systems which pass dry warm air around and through the sugar, keeping it free from moisture and contamination, and preventing caking or



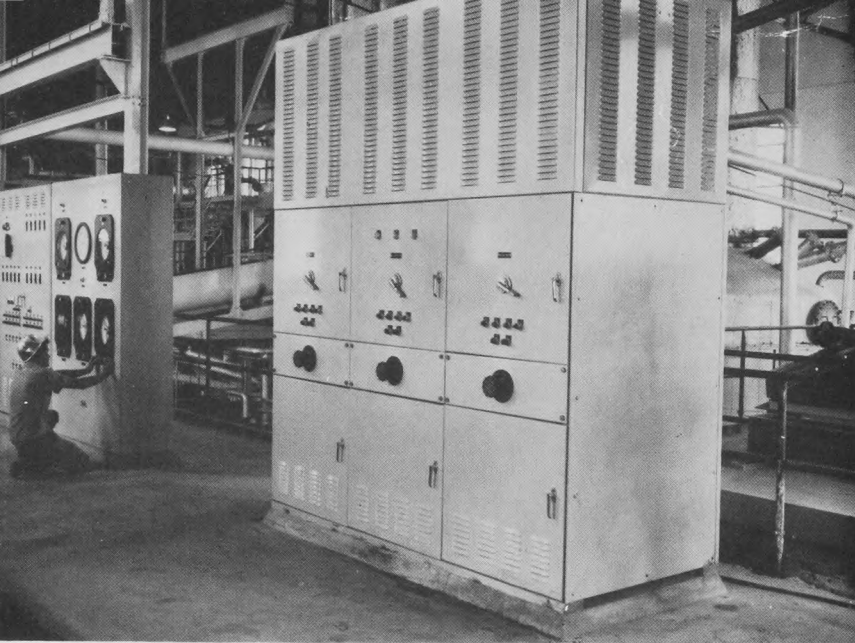
At end of harvest from one hundred to one hundred and fifty thousand tons of sugar beets, piled in the factory yard, await processing.



The centrifugal machine turning at 1,600 revolutions per minute throws out the molasses and retains the sugar within a fine wire screen.

Laboratory technicians in processing season, test more than 400 samples of sugar each day.





Typical modern automatic control equipment installed in 1963.



Bulk storage bins of concrete lined with wood, built in 1962, will hold 30 million pounds of sugar.

lumping of the sugar. Stainless steel and galvanized equipment, free from rust contamination, is used to carry sugar from the factory to the bins and to bring it back to the packing house as required. A dust collection system picks up all dust and sugar dust, the latter to be processed again when the plant is in operation.

In 1963 a new continuous diffuser is being installed at a cost of \$550,000, to provide a more efficient method of processing than was possible with the older type of equipment. Labour will be reduced and sugar extraction improved, and the ever-present waste disposal problem reduced by about one-half. Particles of sugar beet fibre previously reached the waste ponds and in decomposition caused contamination of air in the plant area and reduced oxygen in the water of the Red River. These particles of beet fibre will now be recovered and will be added to the dried beet pulp available for livestock feed.

At this pulp pressing station the fibrous material is converted into valuable livestock feed.

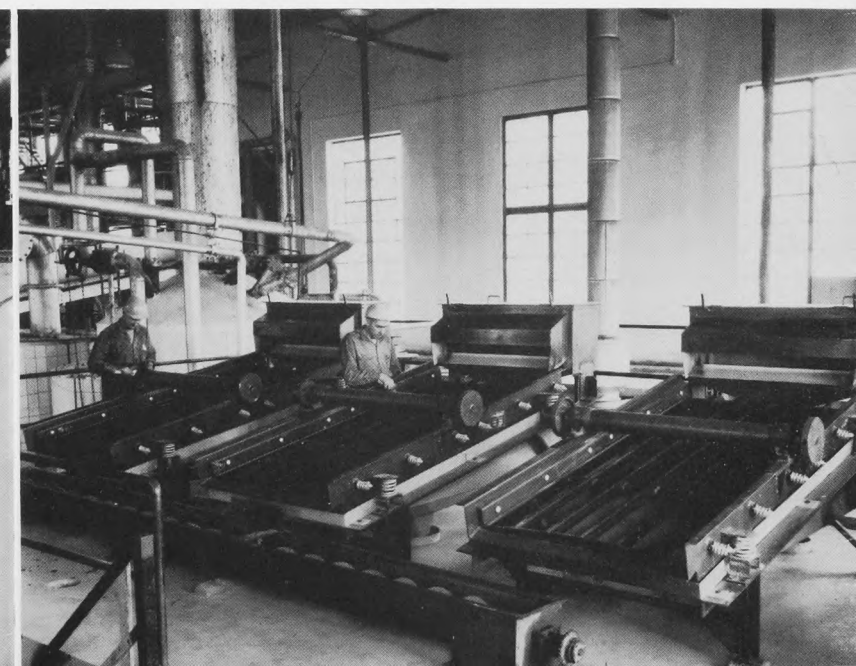


IN BRIEF CONCLUSION

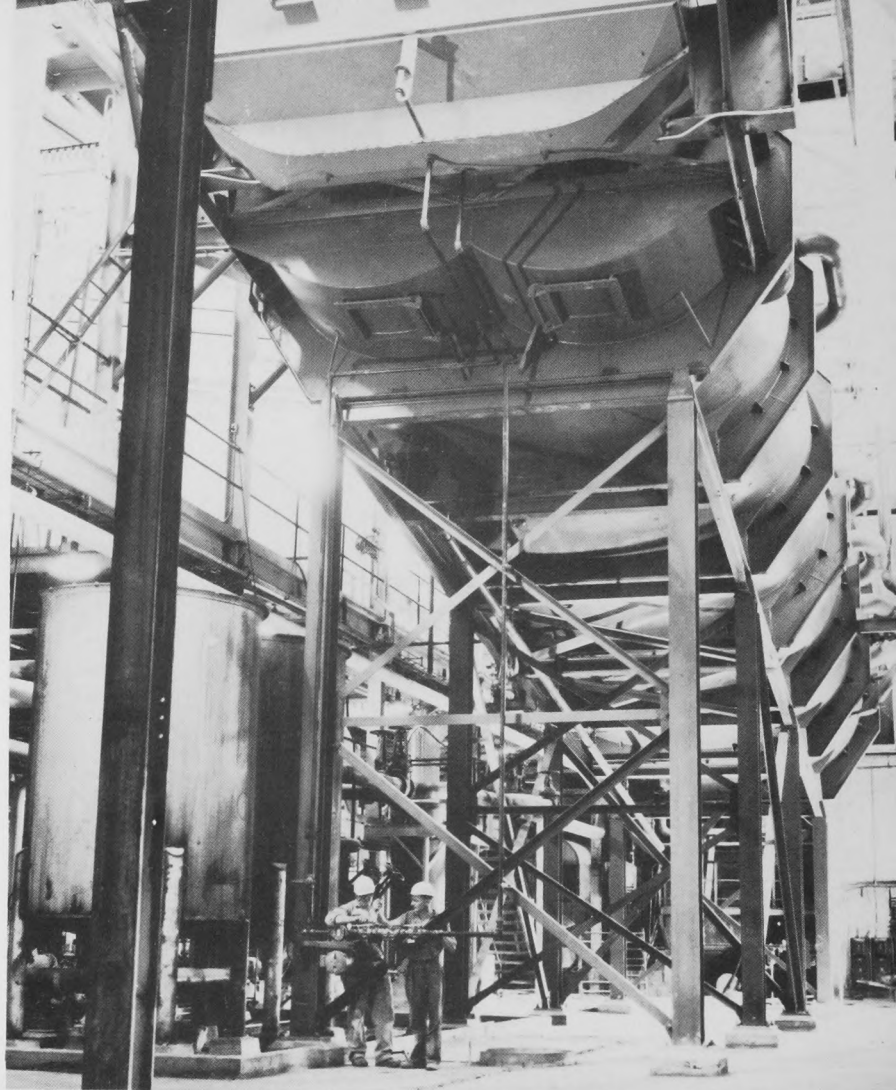
Development of the sugar industry is of very special value to Manitoba. To begin with it provides much needed diversification for our agriculture. We have too much wheat, often difficult to sell. It also provides a dependable cash crop for our beet growers. Another unquestioned benefit comes from substantial increase in employment for labour by both the company and the growers. A further permanent value lies in the fact that money spent for any product manufactured in Manitoba remains in Manitoba and goes into circulation in our province.

A special committee, appointed in 1961 made exhaustive study of factors that would make for economic prosperity in Manitoba. Their conclusion in brief, reported in 1963, was that the development of secondary manufacturing was the key to future prosperity of Manitoba. Processing of sugar comes in the category of secondary manufacturing.

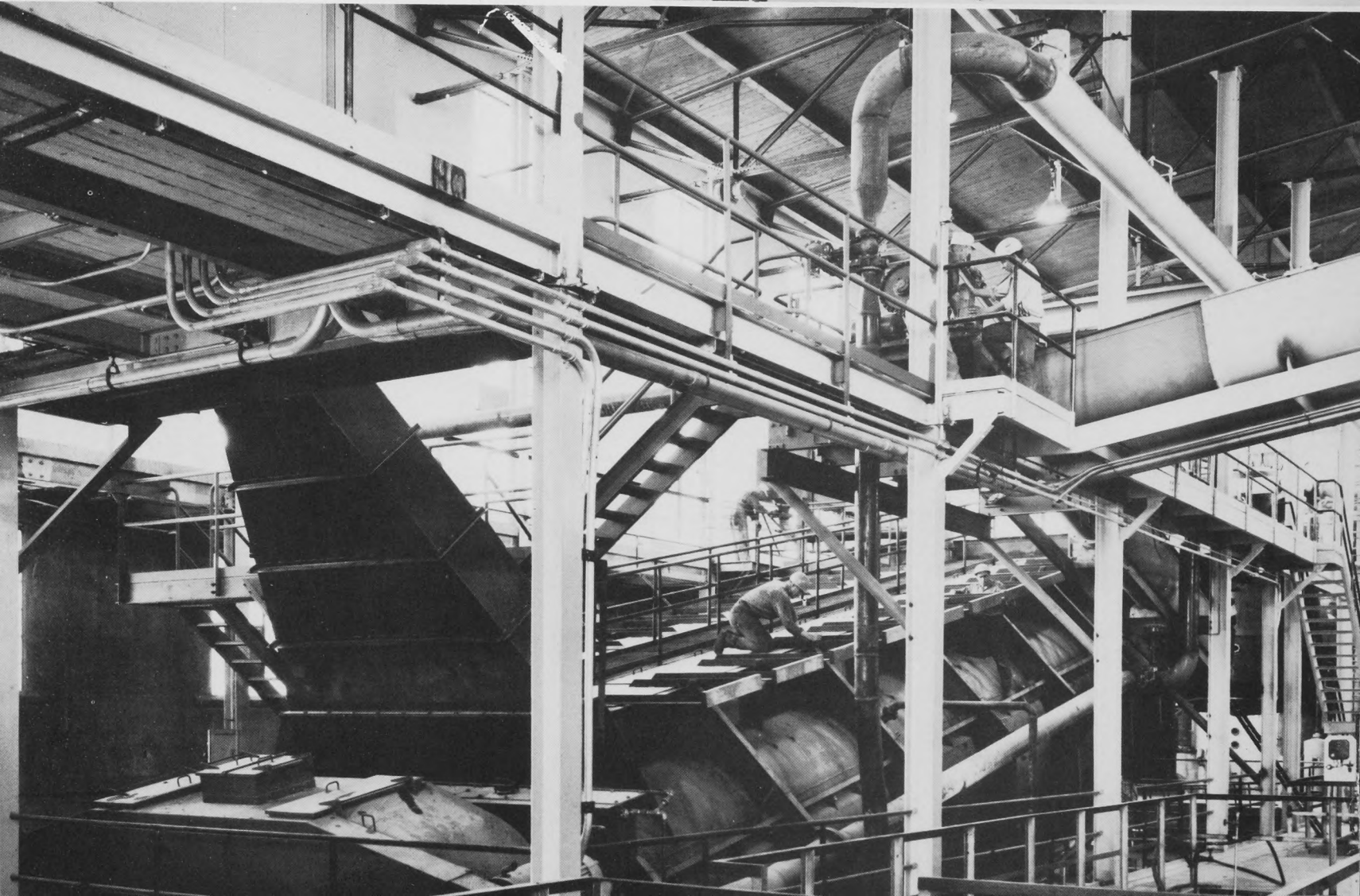
New screening station—one of a series of operations taken to remove undesirable material.



The continuous diffuser,
installed in 1963, provides
efficient extraction of sugar
at high rate of production.



This \$550,000 diffuser shows complexity of modern
beet processing equipment.





MANITOBA SUGAR COMPANY PLANT AT FORT GARRY, MANITOBA